A photograph of a rural landscape under a clear blue sky. In the foreground, a drilling rig is visible on a road. In the middle ground, a tall white wind turbine stands prominently. The background shows a flat landscape with some trees and distant hills.

**Project Summary
2014 Exploratory Drilling
Contract AM-699-14**

May, 2015

**North Dakota Public Service Commission
Abandoned Mine Lands Division
600 East Boulevard Avenue, Department 408
Bismarck, ND 58505-0480**

**North Dakota Public Service Commission
2014 AML Project Summary
Wilton, North Dakota**

Project Type:	Exploratory Drilling
Primary Locations:	Highway 36 between 41st Street and 56th Street and 41st Street N of HWY 36
Project Dates:	September 29 — November 11, 2014; April 13-24, 2015
Contractor:	Antler Enterprises, Inc., Back Hawk, South Dakota
Total Project Cost:	\$165,227.00

The Public Service Commission administers the Abandoned Mine Lands (AML) Program on behalf of the State of North Dakota. The AML Program is charged with eliminating existing and potential public hazards resulting from abandoned surface and underground coal mines. It is funded by a production tax on lignite coal mined in the state.

The Wilton area is home to several abandoned underground and surface coal mines. The one of the largest was underground Washburn Lignite Mine (Wilton Mine #2). It covers nearly all of section 5 and portions of sections 6 and 8 of Township 142N, Range 79W. Wilton Mine #2 opened in 1916 after the close of Wilton Mine #1. The Wilton Mine #2 was an underground slope mine with room and pillar mining as well as a panel system that used a double compartment shaft for lifting coal to the surface.

The Wilton Mine #2 was powered by electricity and included electric water pumps, motors, undercutters, motors for hauling, haulway lighting, ventilation fans and coal hauling cages. Mine production averaged more than 200,000 tons each year (over 650 tons/day) until it ceased operation in 1946. Truax-Traer took over operation in 1931 and operated it as a surface mine before switching back to an underground slope mine in 1942.

The overburden in the area ranges between 30-100 feet depending upon surface topography. The coal seam is between 10 and 13 feet thick with one or two thinner coal layers or "stringers" above the main layer. Approximately 9 feet of the seam was mined.

Despite the efforts of previous reclamation projects in the 1980s and 1990s, subsidence features occur nearly frequently in the ditch along North Dakota State Highway 36 in section 5.

Cover Photo: Antler Enterprises drill rig and water truck in the north ditch of Highway 36 about 4 miles southeast of Wilton, ND. Energy production has always been a part of Wilton's history. Wind towers now dot the landscape where coal mines once dominated.

Work Summary

The collapse of portions the abandoned Washburn No. 2 underground lignite coal mine has resulted in sinkholes dangerously near North Dakota State Highway 36 about 4 miles southeast of Wilton, North Dakota. For safety reasons, the North Dakota Public Service Commission Abandoned Mine Lands Division (ND PSC AML) conducted exploratory drilling in the area to assess the need for more extensive reclamation of the underground mine. The 2014 Exploratory Drilling AML project included rotary drilling, drill hole casing and associated work on the Washburn No. 2 underground lignite coal mine (Map 1). The objective was to obtain subsurface information about the condition and extents of the abandoned underground mine workings. Map 1 contains an overlay of the mine map and the drilling completed in the project.

Drill holes are cased when they intercept a void. A void remains when the coal is removed. Sometimes the voids contain rubble which indicate collapse of portions of the mine. These void and rubble holes are cased with schedule 40 pvc pipe that is suspended in the drilled hole by two metal collars. The casing is countersunk below the surface and closed with a threaded cap. This casing then serves as a conduit for cementitious grout that will be pumped into the hole at a later date.

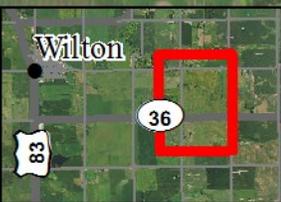
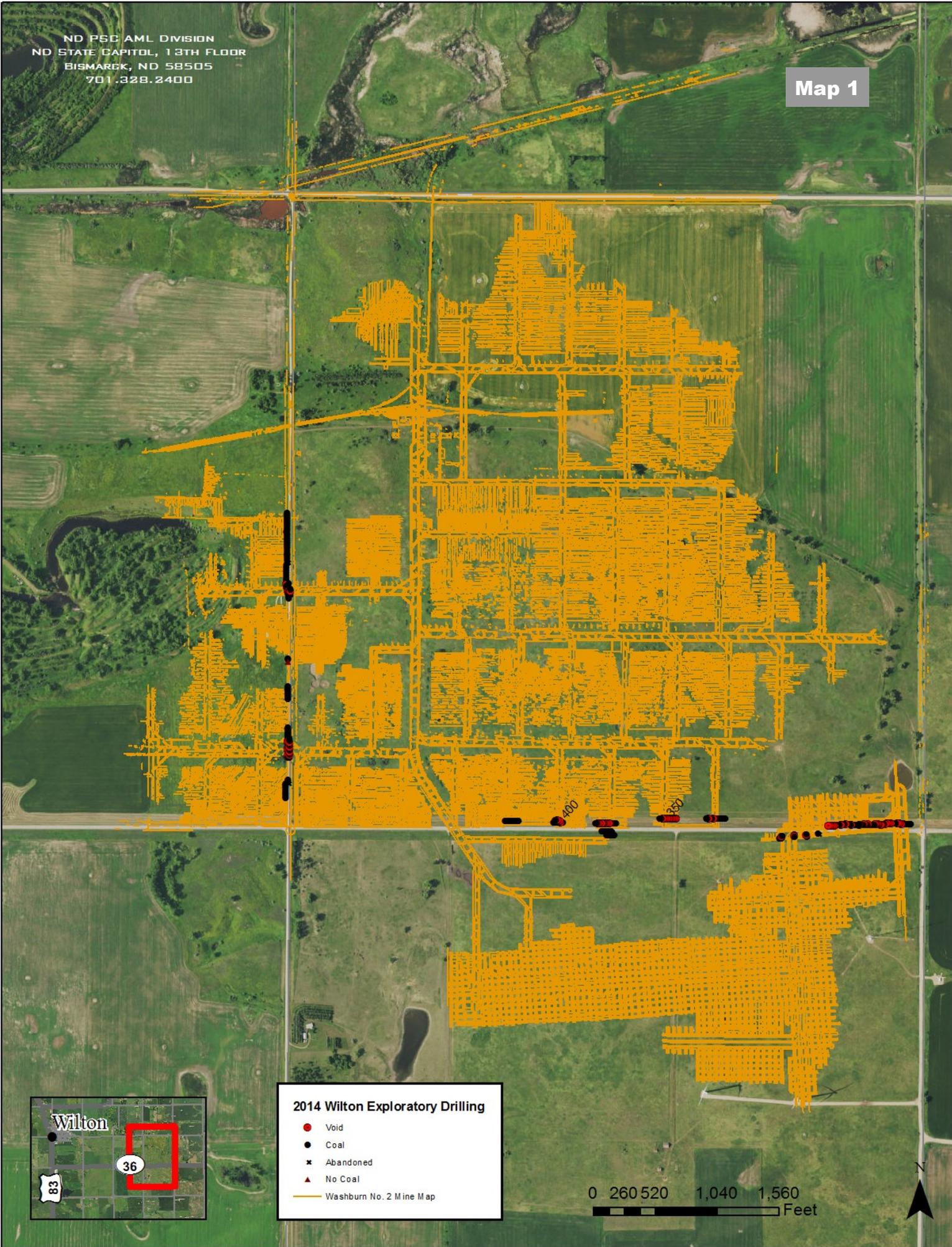
Work began on September 29, 2014 approximately 1/2 mile north of Highway 36 in the west ditch of 41st Street (Map 1). Drilling continued southward in the ditch or along the road shoulder at 10 or 20 foot intervals as shown on Maps 2 & 3. Of the 152 holes drilled along 41st Street, 18 intercepted void spaces in the mine workings, 2 were abandoned and 2 did not hit any coal. The remaining holes all intercepted coal.

Exploratory drilling along Highway 36 between 41st Street and 56th Street (Section line between Sections 5 and 8, Township 142N, Range 79 W) attempted to intercept haul tunnels that run under or near the highway (Maps 4-6). Several holes between Holes 279 and 321 (Map 6) hit fill sand from an earlier reclamation project. These holes were cased for pumping of grout at a later date. The project was suspended on November 11, 2015 due to weather at the request of the contractor. Work resumed April 13, 2015 and was completed on April 24, 2014. Along Highway 36, 187 holes were drilled. Of these 53 encountered voids and 2 were abandoned.

Generally, drilling confirmed information from the mine maps. Void spaces were in varying stages of collapse from open voids in the mine workings to rubble or fill sand (from earlier reclamation) to voids within 30 feet of the surface. Voids that are closer to the surface than the mine workings indicate that the mine has collapsed and the void is moving toward the surface. It is very likely that a sinkhole will eventually appear at the surface. As a result of this AML project, a more extensive drilling and grouting reclamation project is scheduled for late summer of 2015.

ND PSC AML DIVISION
ND STATE CAPITOL, 13TH FLOOR
BISMARCK, ND 58505
701.328.2400

Map 1



2014 Wilton Exploratory Drilling

- Void
- Coal
- * Abandoned
- ▲ No Coal
- Washburn No. 2 Mine Map

0 260 520 1,040 1,560 Feet



Section 6

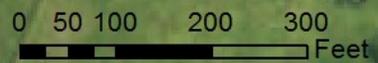
T142N
R 79W

Section 5



2014 Wilton Exploratory Drilling

- Void
- Coal
- ✱ Abandoned
- ▲ No Coal



Section 6

Section 5

T142N
R 79W

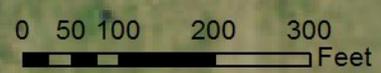
on 7

Section 8



2014 Wilton Exploratory Drilling

- Void
- Coal
- ✕ Abandoned
- ▲ No Coal



Section 5

T142N
R 79W

Section 8

114

400

385

331



2014 Wilton Exploratory Drilling

- Void
- Coal
- ✱ Abandoned
- ▲ No Coal



Section 5

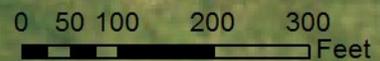
T142N
R 79W

Section 8



2014 Wilton Exploratory Drilling

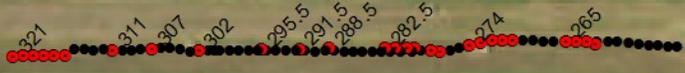
- Void
- Coal
- * Abandoned
- ▲ No Coal



Section 5

Section 4

T142N
R 79W



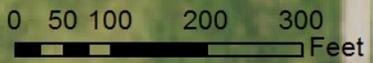
Section 8

Section 9



2014 Wilton Exploratory Drilling

- Void
- Coal
- ✱ Abandoned
- ▲ No Coal



2014 EXPLORATORY DRILLING AML Project Statistics

Project Dates	September 29 — November 11, 2014; April 13-24, 2015
Project Length (consecutive days)	55
Total Work Days	35
Holes Drilled	339
Holes per Work Day	9.7
Holes Cased	71
Feet Drilled	25,727
Feet Drilled per Work Day	735
Feet Cased	5,023

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
A14-101	9/29/14	54-64					65		5 ft North of fence line at 1/2 sect. line on west side of 41st Ave in the ditch
A14-102	9/29/14	54-64					67		10 ft. S of previous
A14-103	9/29/14	54-64					67		
A14-104	9/29/14	54-64					67		
A14-105	9/29/14	54-64					67		
A14-106	9/29/14	54-64					67		
A14-107	9/29/14	54-64					67		
A14-108	9/29/14	54-64					67		
A14-109	9/29/14	54-64					67		
A14-110	9/30/14	54-64					67		
A14-111	9/30/14	54-64					67		
A14-112	9/30/14	54-64					67		
A14-113	9/30/14	54-64					67		
A14-114	9/30/14	54-64					67		
A14-115	9/30/14	54-64					67		
A14-116	9/30/14	54-64					67		
A14-117	9/30/14	54-64					67		
A14-118	9/30/14	54-64					67		
A14-119	9/30/14	54-64					67		
A14-120	9/30/14	54-64					67		
A14-121	9/30/14	54-64					67		
A14-122	9/30/14	54-64					67		
A14-123	9/30/14	54-64					67		
A14-124	9/30/14	57-67					68		
A14-125	10/1/14	57-67					68		
A14-126	10/1/14	57-67					68		
A14-127	10/1/14	57-67					68		
A14-128	10/1/14	57-67					68		
A14-129	10/1/14	57-67					68		
A14-130	10/1/14	57-67					76		
A14-131	10/1/14								skipped
A14-132	10/1/14	57-67					76		
A14-133	10/1/14								skipped
A14-134	10/1/14	57-67					76		
A14-135	10/1/14	57-67					80		
A14-136	10/1/14	57-67					80	20	
A14-137	10/1/14	57-67					80		
A14-138	10/1/14	57-67					80		
A14-139	10/1/14								skipped
A14-140	10/2/14	57-67					80		
A14-141	10/2/14								skipped
A14-142	10/2/14						40		abandoned: cobbles and gravel

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill	Upper	Mid	Lower	Void	Rubble	Total	Total	Comments
A14-143	10/2/14	57-67					80		
A14-144	10/2/14	57-67					80		
A14-145	10/2/14								skipped
A14-146	10/2/14	74-84					85		
A14-147	10/2/14								skipped
A14-148	10/2/14	74-84					85		
A14-149	10/2/14								skipped
A14-150	10/2/14	74-84					85		
A14-151	10/2/14								skipped
A14-152	10/6/14	74-84					85		
A14-153	10/6/14								skipped
A14-154	10/6/14	74-84					85		
A14-155	10/6/14								skipped
A14-156	10/6/14	74-84					85		
A14-157	10/6/14								skipped
A14-158	10/6/14	74-84					85		
A14-159	10/6/14	74-84					90		
A14-160	10/6/14				70-75		75	71	
A14-161	10/6/14	74-84					85		
A14-162	10/6/14	74-84					85		
A14-163	10/6/14	74-84					85		
A14-164	10/6/14	74-84					85		
A14-165	10/6/14				75-85		85	75	
A14-166	10/7/14				76-86		87	71	
A14-167	10/7/14	76-96					87		
A14-168	10/7/14	76-96					87		
A14-169	10/7/14	76-96					87		
A14-170	10/7/14	76-96					87		
A14-171	10/7/14	76-96					87		
A14-172	10/7/14	69-79					80		
A14-173	10/7/14	49-59					60		
A14-174	10/7/14						40		NO COAL/log depth not correct
A14-175	10/7/14						40		NO COAL/log depth not correct
A14-176	10/8/14	34-44					45		
A14-177	10/8/14	34-44					45		
A14-178	10/8/14	34-44					45		
A14-179	10/8/14	34-44					45		
A14-180	10/8/14	34-44					45		
A14-181	10/8/14	34-44					45		
A14-182	10/8/14	34-44					45		
A14-183	10/8/14	36-46					47		
A14-184	10/8/14	36-46					47		

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
A14-185	10/8/14	36-46					47		
A14-186	10/8/14	36-46					47		
A14-187	10/8/14	36-46					47		
A14-188	10/8/14	39-49					50		
A14-189	10/8/14	39-49					50		
A14-190	10/8/14	39-49					50		
A14-191	10/8/14	39-49					50		
A14-192	10/8/14	39-49					50		
A14-193	10/9/14	39-49					50		
A14-194	10/9/14	39-49					50		
A14-195	10/9/14	39-49					50		
A14-196	10/9/14	39-49					50		
A14-197	10/9/14	39-49					50		
A14-198	10/9/14	39-49					50		
A14-199	10/9/14	39-46			46-49		50	43	
A14-200	10/9/14	39-42			42-49		50	37	
A14-201	10/9/14	39-49					50		
A14-202	10/9/14	39-49					50		
A14-203	10/9/14	39-49					50		
A14-204	10/9/14	39-49					50		
A14-205	10/9/14	35-42			42-45		50	37	
A14-206	10/10/14	39-45			45-50		50	40	
A14-207	10/10/14	39-42			42-50		50	37	
A14-208	10/13/14	39-49					50		
A14-209	10/13/14	39-49					50		
A14-210	10/13/14	39-49					50		
A14-211	10/13/14	39-45			45-49		50	40	
A14-212	10/13/14	39-49					50		
A14-213	10/13/14	44-54					55		
A14-214	10/13/14	44-54					55		
A14-215	10/13/14	44-54					55		
A14-216	10/13/14	44-54					55		
A14-217	10/13/14						15		abandoned: cobbles and gravel
A14-218	10/13/14	44-54					55		in ditch
A14-219	10/13/14	44-54					55		
A14-220	10/13/14	44-54					55		
A14-221	10/13/14	44-54					55		
A14-222	10/13/14	44-54					55		
A14-223	10/13/14	44-54					55		
A14-224	10/13/14	44-54					55		
A14-225	10/13/14	44-54					55		
A14-226	10/13/14	44-54					55		

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
A14-227	10/14/14	44-54					55		
A14-228	10/14/14	44-54					55		
A14-229	10/14/14	44-54					55		
A14-230	10/14/14	39-49					50		
A14-231	10/14/14	39-49					50		
A14-232	10/14/14	39-40			40-50		50	35	
A14-233	10/14/14	39-49					50		
A14-234	10/14/14	39-43			43-50		50	38	
A14-235	10/14/14	38-42			42-50		50	38	
A14-236	10/14/14	39-49					50		
A14-237	10/14/14	39-49					50		
A14-238	10/14/14				39-46		47	34	
A14-239	10/15/14	39-45			45-48		48	40	
A14-240	10/15/14	39-49					50		
A14-241	10/15/14	39-49					50		
A14-242	10/15/14				38-45		45	33	
A14-243	10/15/14				38-45		45	33	
A14-244	10/15/14	39-49					50		
A14-245	10/15/14	39-49					50		
A14-246	10/15/14	39-49					50		
A14-247	10/15/14	74-84					85		41st St. top of hill across from Holes 165&166
A14-248	10/15/14	74-84					85		
A14-249	10/15/14	74-84					85		
A14-250	10/15/14				78-85		85	70	
A14-251	10/16/14	64-74					75		
A14-252	10/16/14	74-84					85		
A14-253	10/16/14	38-40	50-53	77-89			90		SE corner of section 5 in N ditch of Hwy 36. 91 ft. west of center of approach; 54 ft N of CL
A14-254	10/16/14	38-40	50-53	77-89			90		
A14-255	10/16/14	38-40	50-53	77-89			90		
A14-256	10/16/14	38-40	50-53	77-89			90		
A14-257	10/16/14	38-40	50-53	77-89			90		
A14-258	10/16/14	38-40	50-53	77-89			90		
A14-259	10/16/14	38-40	50-53	77-89			90		
A14-260	10/16/14	38-40	50-53	77-89			90		
A14-261	10/16/14	38-40	50-53	77-89			90		Wood Chips in 3rd coal layer
A14-262	10/17/14	38-40	50-53	77-89	82-83	83-89	90	77	3 ft South of previous
A14-263	10/17/14	38-40	56-59	78-82	82-89		90	77	
A14-264	10/17/14	38-40	56-59	78-82	82-89		90	77	
A14-265	10/17/14	38-40	56-59	78-89			90		
A14-266	10/17/14	38-40	56-59	78-89			90		
A14-267	10/20/14	38-40	56-59	78-89			90		

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
A14-268	10/20/14	38-40	56-59	78-89			90		
A14-269	10/20/14	38-40	56-59	78-89			90		
A14-270	10/20/14	38-40	56-59			39-79	80	33	
A14-271	10/20/14	38-40			39-40		40	34	likely rubble to 79 ft., but not drilled
A14-272	10/20/14	38-40	56-59	71-78	78-81		82	73	
A14-273	10/20/14	38-40	56-59	74-78	78-84		85	73	
A14-274	10/20/14	38-40	56-59	74-78	78-84		85	73	
A14-275	10/20/14	38-40	56-59	78-89			90		
A14-276	10/20/14	38-40	56-59	78-89			90		
A14-277	10/21/14	38-40	56-59	74-78	78-84		85	73	
A14-278	10/21/14	26-30	43-45	74-78	78-84		85	73	
A14-279	10/21/14	26-30	43-45	74-84			85		
A14-279.5	10/24/14	26-30	43-45	74-801			85	75	Fill Sand 80-84 Ft. no loss of returns
A14-280	10/21/14	26-30	43-45	74-80			85		
A14-280.5	10/24/14	26-30	43-45	74-80			85	75	Fill Sand 80-84 Ft. no loss of returns
A14-281	10/21/14	26-30	43-45	69-79			80		
A14-281.5	10/24/14	26-30	43-45	74-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-282	10/21/14	26-30	43-45	73-83			84		
A14-282.5	10/24/14	26-30	43-45	74-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-283	10/21/14	26-30	43-45	69-79			80		
A14-284	10/22/14	26-30	43-45	69-79			80		
A14-285	10/22/14	26-30	43-45	69-79			80		
A14-286	10/22/14	26-30	43-45	69-79			80		
A14-287	10/22/14	26-30	43-45	69-79			80		
A14-288	10/22/14	26-30	43-45	69-79			80		Fill Sand at 79-80
A14-288.5	10/24/14	26-30	43-45	74-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-289	10/22/14	26-30	43-45	69-79			80		Fill Sand at 79-80
A14-290	10/22/14	26-30	43-45	69-79			80		Fill Sand at 79-80
A14-291	10/22/14	26-30	43-45	69-79			80		Fill Sand at 79-80
A14-291.5	10/24/14	26-30	43-45	74-75			85	70	Fill San at 75-84. no loss of returns
A14-292	10/22/14	26-30	43-45	74-76			80		Fill Sand at 76-80
A14-293	10/22/14	26-30	43-45	69-79			80		
A14-294	10/22/14	26-30	43-45	69-79			80		
A14-295	10/22/14	26-30	43-45	69-79			80		
295.5	10/26/14	26-30	43-45	73-77			85	72	Fill Sand at 77-84 Ft. no loss of returns
296	10/22/14	26-30	43-45	69-79			80		Fill Sand 79-80
297	10/22/14	26-30	43-45	69-79			80		Fill Sand 79-80

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
298	10/22/14	26-30	43-45	69-79			80		Fill Sand 79-80
299	10/22/14	26-30	43-45	69-79			80		Fill Sand 79-80
300	10/22/14	26-30	43-45	73-79			80		Fill Sand 79-80
300.5	10/27/14	26-30	43-45	74-84			85		
A14-301	10/22/14	26-30	43-45	72-70			83		Fill Sand 79-80
A14-302	10/22/14	26-30	43-45	70-76			80	71	Fill Sand 76-80
A14-303	10/22/14	26-30	43-45	69-79			80		Fill Sand 79-80
A14-304	10/23/14	26-30	43-45	69-79			80		
A14-305	10/23/14	26-30	43-45	69-79			80		
A14-306	10/23/14	26-30	43-45	69-79			80		
A14-307	10/23/14	26-30	43-45	69-79			80	68	Fill Sand at 73-79
A14-308	10/23/14	26-30	43-45	70-81			82		
A14-309	10/23/14	26-30	43-45	70-81			82		
A14-310	10/23/14	26-30	43-45	70-81			82		
A14-311	10/23/14	26-30	43-45	69-75			82	70	
A14-312	10/23/14	26-30	43-45	70-81			82		
A14-313	10/23/14	26-30	43-45	70-81			82		
A14-314	10/23/14	26-30	43-45	70-81			82		
A14-315	10/23/14	26-30	43-45	70-81			82		
A14-316	10/27/14	26-30	43-45	70-76			85	71	Fill Sand 76-84
A14-317	10/27/14	26-30	43-45	70-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-318	10/27/14	26-30	43-45	70-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-319	10/27/14	26-30	43-45	70-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-320	10/27/14	26-30	43-45	70-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-321	10/27/14	26-30	43-45	70-78			85	73	Fill Sand 78-84 Ft. no loss of returns
A14-322	10/29/14	26-30	43-45	86-96			97		
A14-323	10/29/14	26-30	43-45	86			97		
A14-324	10/29/14	26-30	43-45	87-97			98		
A14-325	10/29/14	26-30	43-45	88-98			99		
A14-326	10/29/14	26-30	43-45	89-99			100		
A14-327	10/29/14	26-30	43-45	89-99			100		
A14-328	10/29/14	26-30	43-45	89-99			100		
A14-329	10/30/14	26-30	43-45	89-99			100		
A14-330	10/30/14	26-30	43-45	89-99			100		
A14-331	10/30/14	26-30	43-45	89-99			100		
A14-332	10/30/14	26-30	43-45	84-90			100	90	Fill Sand 94-99. casing is blocked at bottom: 90 casing, 88 to bottom
A14-333	11/4/14	26-30	43-45	90-104			105		
A14-334	11/4/14	26-30	43-45	90-104			105		
A14-335	11/4/14	26-30	43-45	90-104			105		

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
A14-336	11/4/14	26-30	43-45			85-104	105	80	
A14-337	11/4/14	26-30	43-45	90-104			105		
A14-338	11/4/14	26-30	43-45	90-104			105		
A14-339	11/4/14	26-30	43-45	100-105	105-113		114	100	
A14-340	10/30/14	26-30	43-45	100-102	102-109		110	97	
A14-341	10/30/14	26-30	43-45	97-103	103-109		110	98	
A14-342	10/30/14	26-30	43-45	100-105	105-111		112	100	
A14-343	11/4/14	26-30	43-45	100-105	105-111		112	100	
A14-344	10/2/14	26-30	43-45	100-105	105-111		112	100	
A14-345	10/2/14	26-30	43-45	100-105	105-111		112	100	
A14-346	10/2/14	26-30	43-45	98-103	103-109		110	98	
A14-347	10/2/14	26-30	43-45	98-100	100-109		110	98	
A14-348	10/2/14	26-30	43-45	96-100	100-107		108	95	
A14-349	10/2/14	26-30	43-45	96-100	100-107		108	95	
A14-350	10/2/14	26-30	43-45	96-100	100-107		108	95	
A14-351	10/2/14	26-30	43-45	96-108			109		
A14-352	11/6/14	26-30	43-45	96-108			109		
A14-353	11/6/14	26-30	43-45	83-96			97		South of HWY 36 in NE corner of Section 8
A14-354	11/6/14	26-30	43-45	83-96			97		
A14-355	11/6/14	26-30	43-45	83-96			97		
A14-356	11/6/14	26-30	43-45	83-96			97		Fill Sand 94-97. No loss of returns
A14-357	11/6/14	26-30	43-45	80-85	85-88		91	80	Fill Sand 88-90. No loss of returns (58th cased hole)
A14-358	11/6/14	26-30	43-45	80-88			91		Fill Sand
A14-359	11/6/14	26-30	43-45	80-90			91		
A14-360	11/6/14	26-30	43-45	87-90			91		100 ft. E of Hole 359
A14-361	11/7/14	26-30	43-45	87-90			91		
A14-362	11/7/14	26-30	43-45	80-85			91	80	Fill Sand 85-90
A14-363	11/7/14	26-30	43-45	80-90			91		
A14-364	11/7/14	26-30	43-45	87-90			91		
A14-365	11/7/14	26-30	43-45	78-90			91		
A14-366	11/7/14	26-30	43-45	78-85			91	80	Fill Sand 85-90
A14-367	11/7/14	26-30	43-45	78-90			91		
A14-368	11/7/14	26-30	43-45	78-90			91		
A14-369	11/7/14	26-30	43-45				80		no log data hole abandoned
A14-370	4/13/15	35-39		87-98			100		
A14-371	4/13/15	35-39		87-98			100		
A14-372	4/13/15	35-39		87-98			100		
A14-373	4/13/15	35-39		87-98			100		
A14-374	4/13/15	35-39	58-60	87-98			100		
A14-375	4/23/15	26-30		87-90	90-100		100	85	
A14-376	4/14/15	35-38	58-60	88-90	90-100		100	90	

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
A14-377	4/14/15	35-39	58-60	87-98			100		
A14-378	4/14/15	35-38	58-60	88-90	90-100		100	85	
A14-379	4/14/15	35-38	58-60	88-90	90-100		100	84	
A14-380	4/14/15	35-38	58-60	88-90	90-100		100		
A14-381	4/15/15	35-38	58-60	88-90	90-100		100	85	
A14-382	4/15/15	35-38	60-72	82-92	92-95		95	87	
A14-383	4/15/15	35-38	58-60	85-96			97		
A14-384	4/15/15	26-30				45-60	60	40	
A14-385	4/15/15	35-38	58-60	78-88	88-90		90	83	
A14-386	4/15/15	35-38	58-60	85-97			98		
A14-387	4/15/15	35-38	58-60	85-94			98		
A14-388	4/15/15	35-38	58-60	85-89			90		
A14-389	4/16/15	35-38	58-60	85-89			90		
A14-390	4/16/15	35-38	58-62			62-66	66	57	
A14-391	4/16/15	35-38	58-60	85-89			90		
A14-392	4/16/15	35-38	58-60	85-89			90		
A14-393	4/16/15	35-38	58-60	85-89			90		
A14-394	4/16/15	35-38	58-60	85-89			90		
A14-395	4/16/15	35-38	58-60	85-89			90		
A14-396	4/16/15	35-38	58-60	85-89			90		
A14-397	4/17/15	35-38	58-60	85-89			90		
A14-398	4/17/15	35-38	58-60		80-85		85	75	
A14-399	4/17/15	35-38	58-60	85-89			90		
A14-400	4/17/15	35-38	58-60			60-70	70	55	
A14-401	4/17/15	35-38	58-60	85-89			90		
A14-402	4/17/15	35-38	58-60	85-89			90		
A14-403	4/20/15	26-30	43-45	67-79			80		
A14-404	4/20/15	26-30	43-45	67-79			80		
A14-405	4/20/15	26-30	43-45	67-79			80		
A14-406	4/20/15	26-30	43-45	67-79			80		
A14-407	4/20/15	26-30	43-45	67-79			80		
A14-408	4/20/15	26-30	43-45	67-79			80		
A14-409	4/20/15	26-30	43-45				45		Abandoned
A14-410	4/20/15	26-30	43-45	67-79			80		
A14-411	4/20/15	26-30	43-45	67-79			80		
A14-412	4/20/15	26-30	43-45	67-79			80		
A14-413	4/21/15	26-30	43-45	67-79			80		
A14-414	4/21/15	26-30	43-45	67-79			80		
A14-415	4/21/15	17-19	37-40	87-100			101		
A14-416	4/21/15	17-19	37-40	87-99			100		
A14-417	4/21/15	17-19	37-40	87-99			100		
A14-418	4/21/15	17-19	37-40	87-99			100		

2014 Exploratory Drilling-Wilton

Drill Hole Data

Units = feet

Hole ID	Drill Date	Upper Coal	Mid Coal	Lower Coal	Void	Rubble	Total Drilled	Total Cased	Comments
A14-419	4/21/15	17-19	37-40	87-99			100		
A14-420	4/21/15	17-19	37-40	87-99			100		
A14-421	4/21/15	17-19	37-40	87-99			100		
A14-422	4/22/15	35-39	58-62	90-106			107		
A14-423	4/22/15	35-39	58-62	90-106			107		
A14-424	4/22/15	35-39	58-62	90-106			107		
A14-425	4/22/15	35-39	58-62	90-106			107		
A14-426	4/22/15	35-39	58-62	90-106			107		
A14-427	4/22/15	35-39	58-62	90-106			107		
A14-428	4/22/15	35-39	58-62	90-106			107		
A14-429	4/22/15	35-39	58-62	90-106			107		
A14-430	4/22/15	35-39	58-62	90-106			107		
A14-431	4/22/15	35-39	58-62	90-106			107		

TOTAL 25727 5023



Above: Drilling on the high side of the north ditch along Highway 36. The white pipe is schedule 40 pvc that is used to case a borehole that has encountered a void.

Below: Ken Diers of Antler Enterprises drills another hole as his crew completes setting casing in a hole that intercepted mine workings.





Upper Left: Antler Enterprises drilling crew installing casing into a borehole that intercepted mine workings..

Upper Right: The white flags mark the location of a hole drilled into the mine. The pink whiskers identify holes that have been cased. The casing is “counter sunk” to reduce the likelihood of casing breakage.

Lower Left: Ken Diers of Antler Enterprises is ready to “counter sink” a hole with a “bit” of his design.



Upper Left: Ken of Antler Enterprises continues drilling as helper, Sean, gets casing ready to install casing.

Upper Right: Safety is very important at the drilling site. Signage helps alert drivers to drilling activities on or near a road. The drill rig is visible in the background.

Lower Left: A soap mixture is sometimes added to water when especially sticky clay is encountered while drilling. Sticky clays can clog the bit and the hole. Water and this soap mixture help bring the drill cuttings to the surface and keep the bit and hole clear.



Upper Left: A series of boreholes in the north ditch of State Highway 39. The holes were backfilled first with bentonite to 5 feet above the water table, then dry cuttings. Excess cuttings were used to fill a sink hole.

Lower Left: Drilling along the east side of 41st Street. Water is being injected as a drilling aid.

Lower Right: Wood chips were brought to the surface by drilling. Drilling intercepted a timber that was used as support in one of the mine's tunnel.

